

ON A GIANT SQUID
OMMASTREPHES CAROLI Furtado
STRANDED AT LOOE
CORNWALL

BY

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Pp. 29-42; Pls. 1-2; 12 text-figures; 3 maps in the text

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ON A GIANT SQUID, *OMMASTREPHERS CAROLI* Furtado STRANDED AT LOOE, CORNWALL

By W. J. REES, D.Sc.

THE object of this note is to place on record some details of a female specimen of *Ommastrephes caroli* Furtado¹ stranded in live condition at Looe, Cornwall, in November 1940. It was acquired by the Plymouth Laboratory and was photographed before preservation by Mr. D. P. Wilson, to whom I am indebted for the excellent photographs. Subsequently it was preserved in formalin at the Laboratory, where I was able to examine it by kind permission of Mr. F. S. Russell, F.R.S.

The earliest certain record of a stranding of this species, near Scheveningen in Holland in 1661, is mentioned by Steenstrup (1887), and in the same year the species was described for the first time by Furtado from Portuguese specimens in the Lisbon Museum. It was subsequently reported from the Faroes by Lönnberg (1897), and since that date there has been a number of records—all strandings—from British waters and one from Heligoland; these are summarized by Clarke & Robson (1929) and, more recently, by Stephen (1944). Apart from these positive records, there are occasional reports of strandings unsupported by details, and probably also strandings on lonely coasts which are never reported, so that the number of actual strandings is possibly much more frequent than indicated in the literature.

It is curious that this species is known only from strandings and that all the known specimens are females. *O. caroli* most nearly resembles *O. bartrami* (Lesueur, 1821), from which it can be readily distinguished by the remarkable membranes of the third arms—this feature being absent in *O. bartrami* and *O. pteropus*. Robson (1925) described the largest example of *O. caroli* yet found from a stranding at Withernsea, Yorkshire, and although the Looe specimen is a little smaller it is larger than all the others that have been measured.

The standard measurements of *O. caroli* from Looe are given below:

<i>Measurements in mm.</i>			
Overall length (apex to tip of right tentacle) . . . . .	.	.	1,860
Total length (i.e. including 3rd arm) . . . . .	.	.	1,225
Dorsal mantle length . . . . .	.	.	670
Ventral mantle length . . . . .	.	.	650
Maximum mantle width (excluding fins) . . . . .	.	.	245
Maximum mantle width (including fins) . . . . .	.	.	570
Width at mantle openings . . . . .	.	.	205
Length of head . . . . .	.	.	170
Interocular width . . . . .	.	.	170
Thickness of head . . . . .	.	.	100
Arm length:			
		<i>Right</i>	<i>Left</i>
1st . . . . .	.	360	355
2nd . . . . .	.	415	415
3rd . . . . .	.	415	400
4th . . . . .	.	445	445
Tentacle length . . . . .	.	1,100	1,300
Tentacle, length of sucker-bearing surface . . . . .	.	463	460

¹ I have followed Winckworth (1932) in referring this species to *Ommastrephes* although most authors have recorded the species under the name *Sthenoteuthis caroli*.

The Looe specimen agrees well with Robson's Withernsea example as regards colour and most external features and I have omitted further reference to them. I have, however, thought it desirable to redescribe the tentacles, arms, and suckers in some detail.

The first pair of arms are quadrate in section and carry 25-26 pairs of suckers in oblique pairs on ridges. The proximal six pairs are well spaced, then distally, the remaining pairs are set closer together and give the appearance of being alternate. Suckers in the first or proximal row have a diameter of less than 10 mm. Those of the second to the eleventh rows are 10 mm. or over in diameter, while those of rows 12-26 gradually decrease in size down to 1 mm. in diameter. On the right arm the largest suckers (on the fifth row) have a diameter of 13 mm. The left arm is very similar, with suckers of 14 mm. diameter in the fourth row.

Both second arms are strongly keeled along their whole length and there are twenty-seven rows of suckers beginning with medium-sized proximal ones of 9 mm. in diameter. Distally there is a gradual increase in sucker width to 20 mm. in the eighth row, followed by an abrupt reduction to 12-15 mm. in the ninth row.

The third arms have about twenty-eight pairs of suckers with similar appearance to those of the second arms. The proximal suckers are only 8 mm. in width, with a gradual increase distally to 13 mm. in the ninth row, followed by a gradual decrease. There is a well-developed keel which is much enlarged not far from the tip of the tentacle to form a strong crest. This is 70 mm. deep opposite the twenty-third and twenty-fourth rows of suckers. The lateral membrane, too, is very well developed and has a distinctive and characteristic shape—at least in the female, for the male is unknown. It extends from the base of the arm to within 60 mm. of its tip. The membrane is greatly enlarged distally to form a large, thin flap of a curious shape (Pls. 1 & 2). In the left arm this has a width of 220 mm., while in the right arm it is rather torn and is estimated to have a width in excess of 160 mm. Robson (1925) has discussed the shape of this organ in relation to the differentiation of species, but it is apparent, even in this fine specimen, that little reliance can be placed on it for taxonomic purposes because of its fragile nature.

The right and left ventral arms have thirty-six and thirty-four pairs of suckers respectively; these are widely spaced on the flat, sucker-bearing face of the tentacle. On the right arm the proximal suckers have a diameter of 7 mm., and there is a gradual increase in size to 14 mm. in the seventh row. Large suckers of 12-14 mm. diameter are maintained to the tenth pair, after which there is a gradual decrease down to 1 mm. or less at the tip of the arm. The left arm is similar, with larger suckers of 15-16 mm. diameter in the sixth to ninth rows.

The right and left tentacles respectively are 1.65 and 1.94 times the length of the dorsal mantle. The following description applies to the right tentacle. It can be conveniently differentiated into four regions to facilitate description: viz. the tip portion, the large sucker region, the locking-apparatus region, and the proximal portion devoid of suckers.

The tip portion, 87 mm. long, carries oblique rows of four suckers each at the extreme tip; these are small with a diameter of 1 mm. Proximally these become enlarged to 5-6 mm. diameter with only three in a row.

In the large sucker region of the manus there are eleven rows of suckers with four to each oblique row. The two median ones in each row are much enlarged, reaching a maximum size of 17–21 mm.; those of the first and second row adjoining the tip portion are slightly smaller with diameters of 10 and 13 mm. respectively. On each side, flanking the median suckers, are smaller, long-stalked suckers of about 8 mm. diameter. These are borne on the transverse ridges.

The locking-apparatus region (carpus) has three tubercles alternating with three smooth-ringed suckers and is similar in arrangement to that figured by Goodrich (1892) for *O. pteropus*. These smooth carpal suckers are small with a diameter of only 3 mm. The ordinary suckers of this region, counting from the most distal tubercle, are twelve in number and diminish in size down to 5 mm. proximally.

On the sucker-less part of the tentacle there are fourteen transverse ridges which become fainter and disappear towards the base.

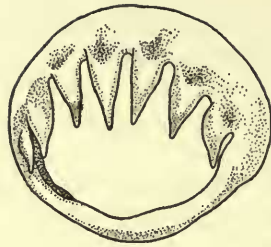
The tentacle is keeled along its dorsal surface and becomes slightly finned in the part corresponding to the distal half of the large sucker region and the proximal half of the tip portion. There are narrow, undulating fins along both sides of the sucker-bearing face. Proximally the fin on the dorsal edge is less prominent but persists as a thin ridge as far as the end of the transverse ridges. The ventral fin reaches only to the tenth transverse ridge (from the base). Sucker rings of this species have been figured by Furtado and by Lönnberg, but unfortunately those of Furtado are not very clear and Lönnberg has failed to indicate the precise position of the suckers on the arms and tentacles. As Robson (1925) has pointed out, the dentition of the rings varies according to their position, the proximal teeth of the arm suckers being lost towards the free end of the arm. The earlier figures are therefore of little use for comparison, so new ones have been drawn from known positions on the arms (Figs. 1–3).

On the basal portion of the arms the suckers are toothed all round, but the proximal teeth are small and often rudimentary (Fig. 3). Distal sucker rings have lost their proximal teeth and are of the form illustrated in Figs. 1 and 2. Typically these suckers have seven, long, backwardly directed teeth. The points where the proximal teeth disappear on each arm are fully discussed by Robson (1925).

The tentacular sucker rings are dentate all round and also show some variation according to their position (Figs. 4–6). The distal teeth are curved inwards, while the proximal teeth, although often reduced in size, are bent outwards in the same direction as the distal ones; thus the teeth of the whole ring are admirably arranged for clawing. Fig. 4 illustrates a ring with twenty-one teeth, whereas that portrayed in Fig. 5 has twenty-three teeth. The larger rings of the manus are typically ommastrephid in character with four enlarged teeth (one in each quadrant). This, the largest sucker ring of the club, has twenty-seven teeth.

The stranding of giant squids of the genera *Architeuthis* and *Ommastrephes* on British coasts has aroused much interest during the past twenty years; the significance of the strandings, especially the preponderance of records along the east coast of Britain, being the subject of speculation by Clarke & Robson (1929), Robson (1933), and Stephen (1944).

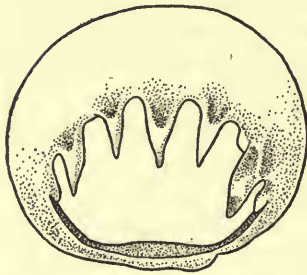
The known strandings of *O. caroli*, *O. pteropus*, and *Architeuthis* spp. are plotted on



1a



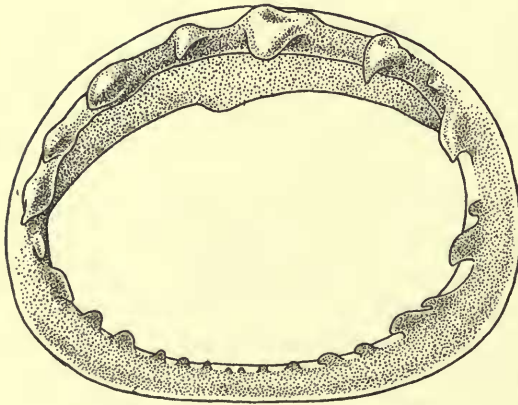
1b



2a



2b



3a



3b

FIGS. 1-3. Sucker rings from the arms in face and oblique views.

1 a & b., ring, 3.6 mm. in diameter, from 2nd left arm, 21st row.

2 a & b., ring, 8.5 mm. in diameter, from 3rd left arm, 12th row.

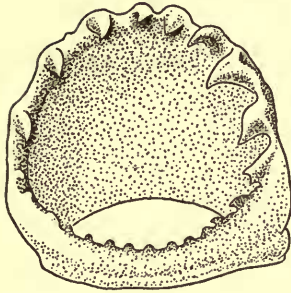
3 a & b., ring, 13 mm. in diameter, from 4th left arm, 8th row.



4a



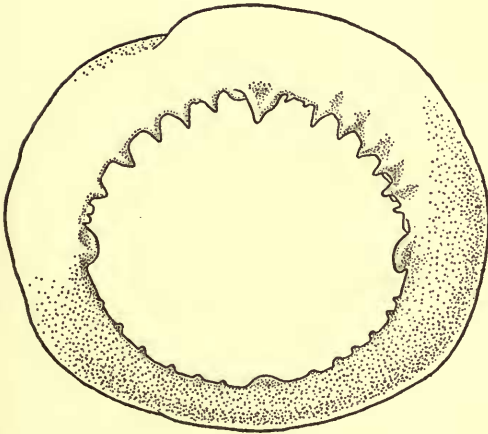
4b



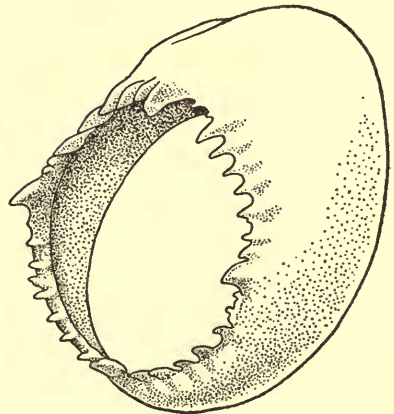
5a



5b



6a



6b

FIGS. 4-6. Tentacular sucker-rings in face and oblique views.

4 a & b., medium-sized sucker-ring, 3.75 mm. in diameter, from the tip portion of the tentacle.

5 a & b., ring, 6.3 mm. diameter, from the long-stalked suckers of the manus.

6 a & b., typical ring, 18 mm. in diameter, from the middle of the manus.

Maps I–III, and it is at once evident that most of the specimens have come ashore at three places, viz. the Scarborough area, the Dunbar–North Berwick area, and at Buckie. Another feature of the strandings is that all, with the exception of a single record of *O. pteropus* at North Berwick in June 1921, have come ashore during the winter months from November to March.

Clarke & Robson correlate the strandings on the Yorkshire coast with hydrographic conditions which favour stranding, especially if the animal is enfeebled by some cause. They quote Bowman's testimony that a high percentage of drift bottles released in the north are finally stranded on the mid-Yorkshire coast and between Berwick and St. Abb's Head.

Architeuthis and *Ommastrephes* are clearly oceanic species which occasionally migrate into the North Sea, possibly during the summer months, and are later enfeebled by unfavourable conditions during the winter months. There is as yet no clue as to what these factors are, but it is probable that lack of suitable food, lower salinity (especially near the coast), and temperature fluctuations have an adverse effect.

Various Ommastrephids are, as young animals, common in the surface waters of temperate and tropical seas, but so far the habits of the large adults are a matter for speculation. Perhaps the single record of *Ommastrephes pteropus* (trawled off St. Kilda, at a depth of 180–200 fathoms in September 1925) is an indication of its normal habitat on the edge of the continental slope. Robson (1933) in discussing the distribution of *Architeuthis* was also inclined to favour this view.

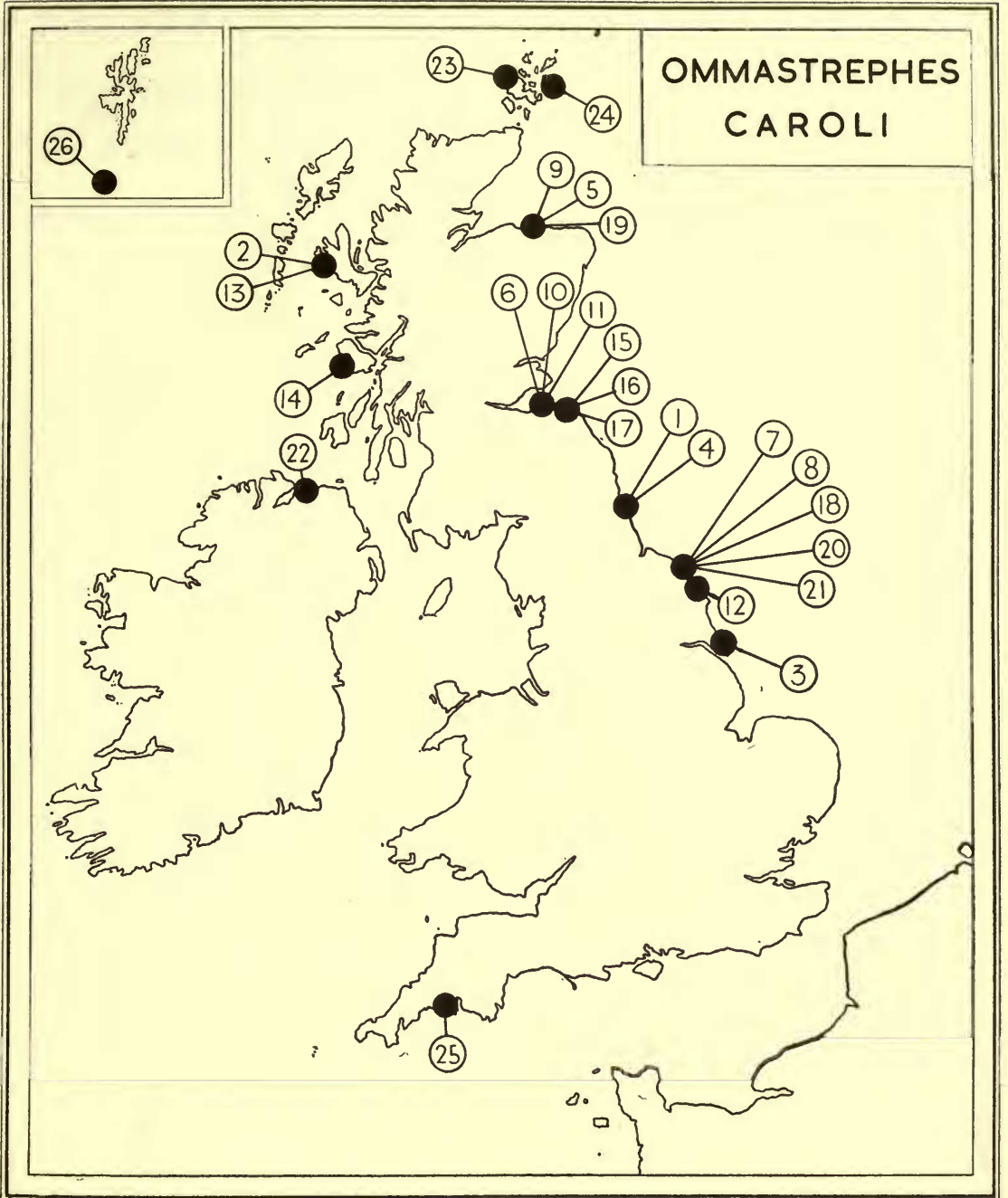
If we may judge by the records plotted on Maps I–III, *O. caroli* is the most frequent immigrant into the North Sea, while *O. pteropus* is just as rare as *Architeuthis* in British waters.

The British records of these giant squids are scattered in the literature, and are, for the sake of completeness, given below.

BRITISH RECORDS OF *OMMASTREPHEs CAROLI*

1. 8 Jan. 1911. Briar Dene, Northumberland; Meek & Goddard (1926). Length (including 3rd arm) 3 ft. 11 in. (1,175 mm.).
2. Feb. 1921. Isle of Skye; Stephen (1944).
3. 3 Jan. 1925. Withernsea, S. Yorkshire; Robson (1925).
4. 7 Jan. 1925. Cullercoats, Northumberland; Meek & Goddard (1926). Length (including 3rd arm) 3 ft. 8 in. (1,118 mm.).
5. 14 Jan. 1927. Buckie, Moray Firth; Stephen (1944).
6. March 1927. N. Berwick; Stephen (1944).
7. 18 March 1927. N. Bay, Scarborough, Yorkshire; Clarke & Robson (1929). Length 5 ft. 7 in.
8. 1 Feb. 1928. Scarborough; Clarke & Robson (1929). Length (including 3rd arm) 3 ft. 6 in.
9. Jan. 1929. Buckie, Moray Firth; Stephen (1944).
- 10–11. Dec. 1929. N. Berwick; Stephen (1944), 2 specimens.
12. 9 Jan. 1930. Filey, Yorkshire; Clarke (1930) & Stevenson (1935). Length (including 3rd arm) 3 ft. 9 in.
13. 10 Feb. 1930. Isle of Skye; Stephen (1944).
14. Feb. 1930. Isle of Mull; Stephen (1944).
15. March 1930. Dunbar; Stephen (1944).
- 16–17. 6 Jan. 1931. Dunbar; Stephen (1944), 2 specimens.
18. 22 Dec. 1931. South Sands, Scarborough; Stevenson (1935). Overall length 5 ft. 10 in.

MAP I

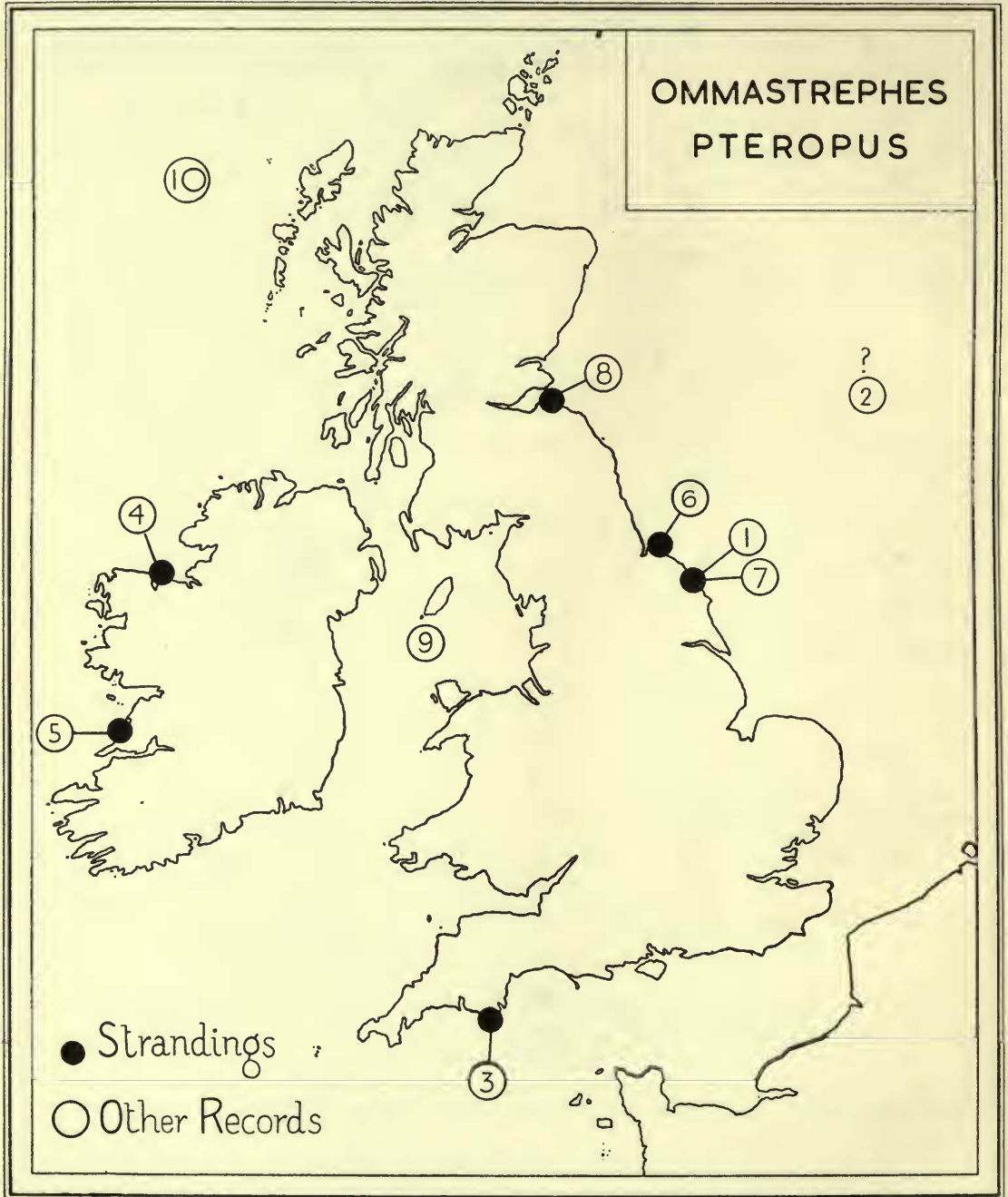


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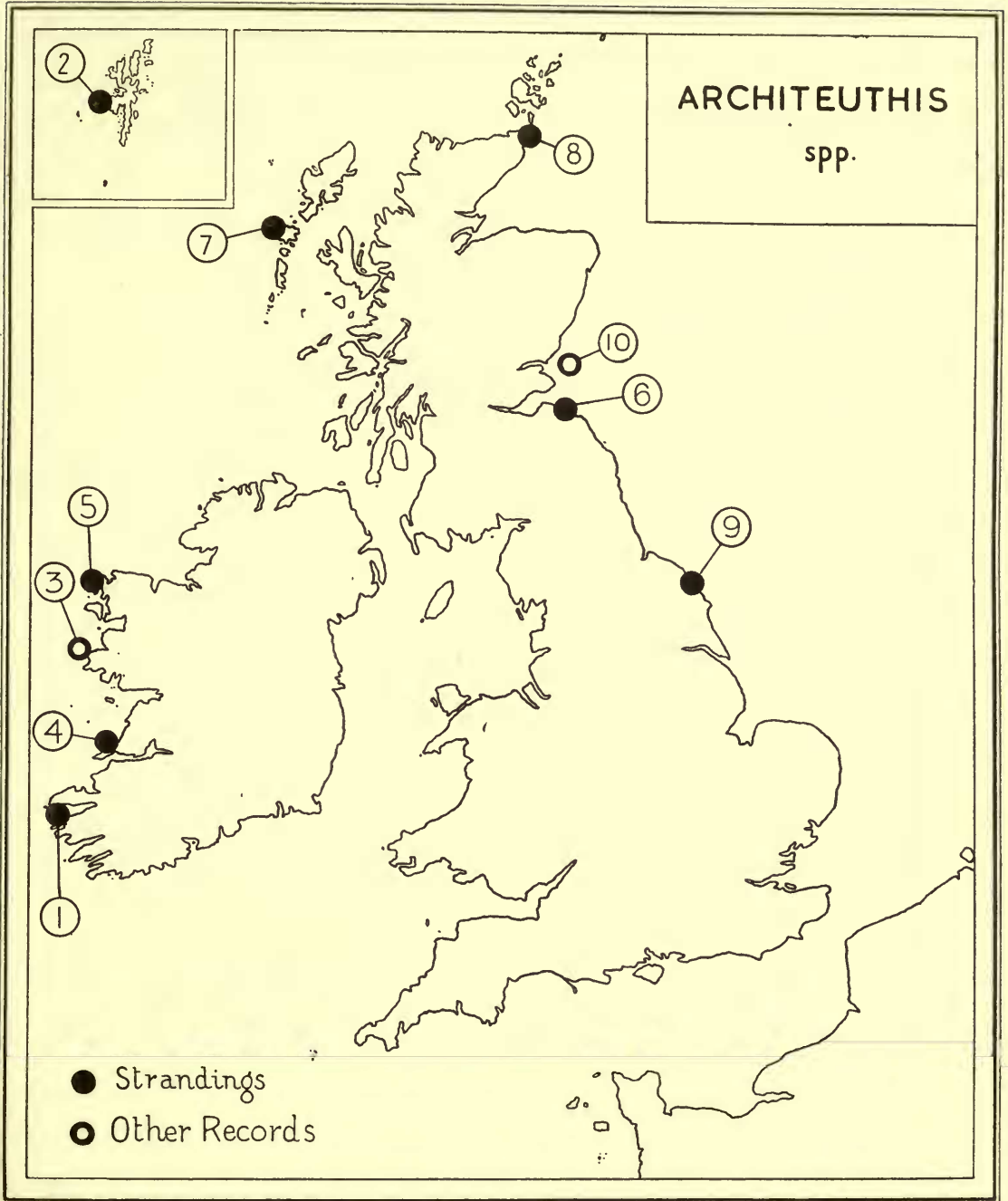
The London Geographical Institute

STRANDINGS OF *OMMASTREPHESES CAROLI* FURTADO ON BRITISH COASTS

MAP II



MAP III



19. 12 Dec. 1932. Buckie, Moray Firth; Stephen (1933). Overall length 6 ft. 2 in.
20. 31 Jan. 1935. South Bay, Scarborough; Clarke & Stevenson (1935). Overall length 5 ft.
21. 13 Feb. 1935. 1½ miles north of Scarborough; Clarke & Stevenson (1935). Overall length 5 ft. 2 in.
22. 3 Nov. 1935. Castlerock, Co. Londonderry; Stendall (1936). Determined by A. C. Stephen.
23. 24 Nov. 1937. Birsay Parish, Orkney; Stephen (1938). Overall length 5 ft.
24. 18 Dec. 1937. Stronsay, N. Orkney; Stephen (1938). Overall length 5 ft. 8 in.
25. Nov. 1940. Looe, Cornwall (present record).
26. Jan. 1941. Fair Isle, Shetland; Stephen (1944).

BRITISH RECORDS OF *OMMASTREPHEs PTEROPUS* STEENSTRUP

1. 19 Nov. 1883. Scarborough; Goodrich (1892).
2. 27 Feb. 1884. 'North Sea'; Goodrich (1892).
3. Jan. 1892. Salcombe, Devon; Goodrich (1892).
4. ? Killala, Co. Mayo; Nichols (1905, 'many years ago').
5. ? Miltown Malbay, Co. Clare; Nichols (1905, 'a few years ago').
6. 19 Dec. 1907. Redcar; Hoyle (1908).
7. 1 Mar. 1912. Redcliff, near Scarborough. Length (including 3rd arm) 3 ft.
8. June 1921. N. Berwick, Firth of Forth; Ritchie (1922).
9. ? Isle of Man; Robson & Chadwick MS.
10. Sept. 1925. Trawled off St. Kilda in 180–200 fathoms. Overall length 6 ft. (det. Robson).

BRITISH RECORDS OF *ARCHITEUTHIS* SPP.

1. 1673. Dingle Bay, Co. Kerry, S. Ireland; (More, 1875: 4526, as *Dinoteuthis proboscideus*).
2. 1860–1861. Between Hillswick and Scalloway, W. Shetland; (Jeffreys, 1869: 124, as *Architeuthis monachus*).
3. 25 Apr. 1875. Caught at sea off Boffin Island, Connemara, Ireland; (More, 1875: 123).
4. Oct. 1880. Stranded at Kilkee, Co. Clare, S. Ireland; (Ritchie, 1918: 137, as *Architeuthis*).
5. 1914. In stomach of a sperm whale at Belmullet Whaling Station; (Hamilton, 1915: 137).
6. 2 Nov. 1917. Stranded at Dunbar, Firth of Forth; (Ritchie, 1918: 133, as *Architeuthis harveyi*).
7. Feb. 1920. Stranded at N. Uist, Outer Hebrides; (Ritchie, 1920: 57, as *Architeuthis harveyi*).
8. 1921. Stranded at Caithness, Scotland; (Ritchie, 1922: 423, as *Architeuthis harveyi*).
9. 14 Jan. 1933. Stranded at Scarborough, Yorkshire; (Robson, 1933, as *Architeuthis clarkei* n. sp.).
10. 7 Nov. 1937. Off Bell Rock, Angus, E. Scotland; (Stephen, 1937, as *Architeuthis harveyi*).

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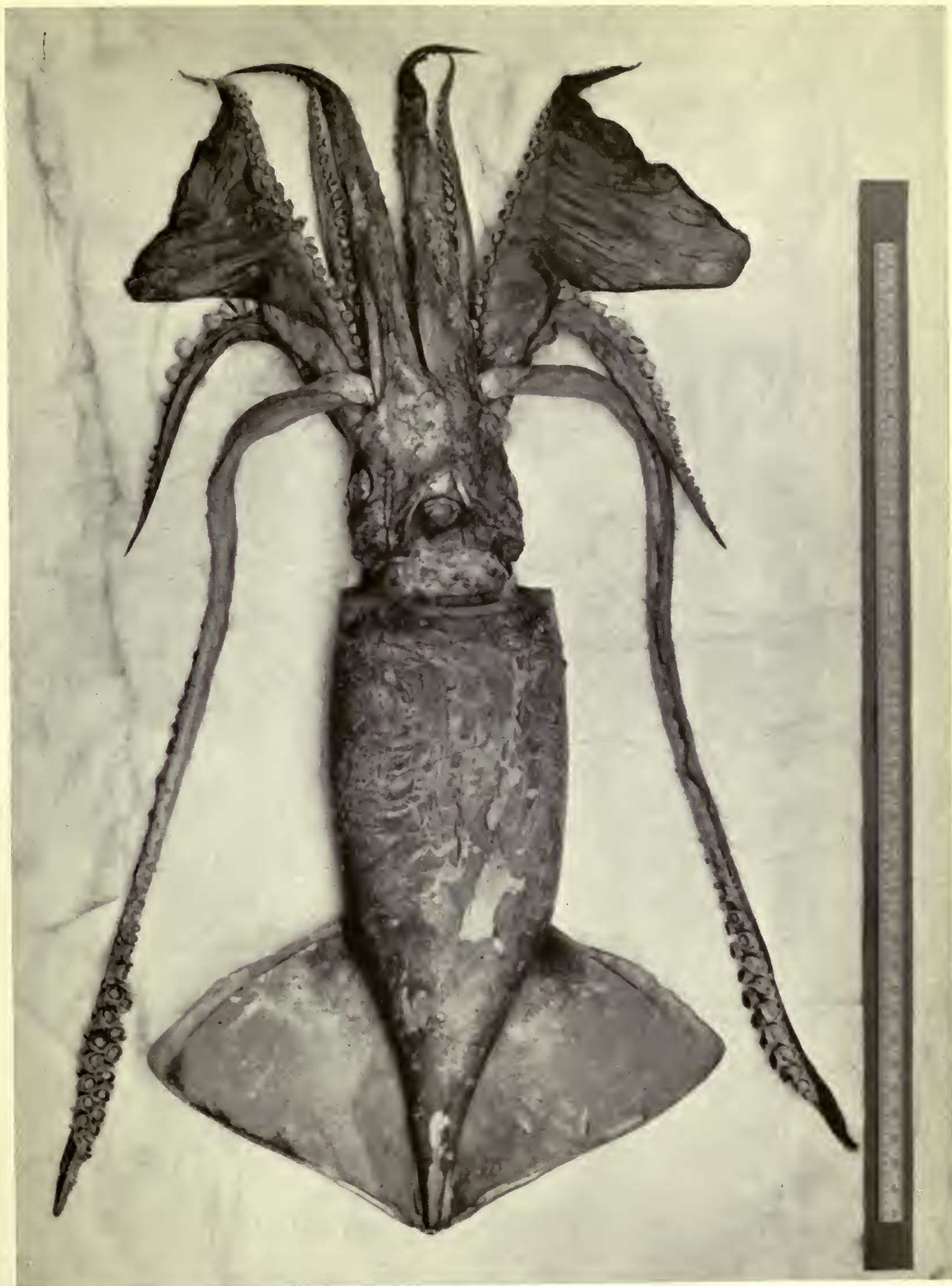
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OMMASTREPHEs CAROLI; DORSAL VIEW

Photo. D. P. Wilson





OMMASTREPES CAROLI; VENTRAL VIEW

Photo. D. P. Wilson